Center Innovation Fund: ARC CIF

Raising the Technical Readiness of Germanium Immersion Gratings for a Space-based High-resolution Infrared Spectrometer

Completed Technology Project (2015 - 2016)

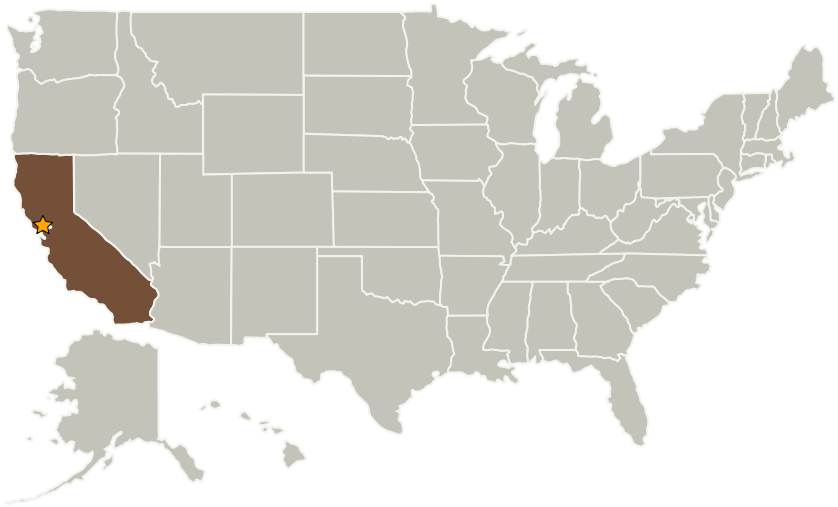
Project Introduction

Using a high index of refraction material such as Germanium (n=4) to diffract light in an infrared spectrometer results in a smaller beam than that required using reflective gratings with air or vacuum (n=1) as the diffraction medium. The resulting instrument is thus much smaller and lighter. For R=50,000 at 3 microns, the beam can be <1 inch. A Ge IG used in the envisioned spacecraft can also use a passively-cooled detector that operates out to 10 microns. We propose to employ this optical element in a compact infrared spectrometer that could use light from a variety of future space-based telescope missions. Our approach leverages capabilities currently assembled at, and aligned with ARC. Deliverables: A grating and test reports that support a SAT ROSES proposal.

Anticipated Benefits

Potential customers and Applications: Saturn Probe; Solar System atmospheres; Galactic star & planet formation; Astrochemistry research; Exo-planet discovery and characterization.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California

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Primary U.S. Work Locations
California

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Center Innovation Fund: ARC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

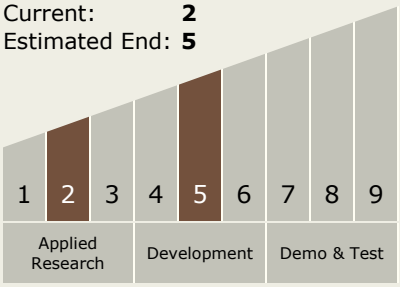
Harry Partridge

Principal Investigator:

Peter T Zell

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes